

Information Paper – Extract from IC-ENC Technical Conference 04 Report – High Density Bathymetry ENC

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| Submitted by: | IC-ENC General Manager |
| Executive Summary: | This paper provides WENDWG10 with an extract from the Report of the IC-ENC Technical Conference 04 (TC04), Panama, October 2019. It describes two presentations from IC-ENC members (Australia and Belgium) on their approach to High Density Bathymetry ENC (HD ENC), and summarises the subsequent discussion at the TC04. |
| Related Documents: | N/A |
| Related Projects: | N/A |

Introduction / Background

1. Compilation of high density bathymetry ENC is in progress/under consideration by a range of ENC producers. This paper provides WENDWG10 with an extract from the Report of the IC-ENC Technical Conference 04, Panama, October 2019. It describes two presentations from IC-ENC members (Australia and Belgium) on their approach to High Density Bathymetry ENC (HD ENC), and summarises the subsequent discussion.
2. This information paper is a contribution to the High Density Bathymetry ENC discussion at WENDGW10 under agenda item 03D.

Analysis/Discussion –

3. IC-ENC Technical Conference 04 Report Extract:

2.1.2 HD ENC**2.1.2.1 High Density Bathymetric ENC – AU**

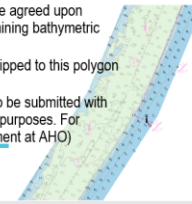
AU presented to members their experience producing HD ENC, AHS currently produce 6 HD ENC. Each HD ENC are based on collaboration between AHS and the requesting Port Authority, the Port Authority must supply a business case for each HD ENC before production and consideration is given to identifying if existing coverage can be modified without the need for the new product. AHS targets to complete the HD ENC within 2 weeks of survey receipt, to facilitate this, surveys must be supplied to an agreed standard enabling minimal manual compilation effort from AHS.

AU HD ENC cover a predefined area and only show features deemed critical to navigation. AU use automation to aid in HD ENC compilation, including automatic depth area generation and sounding suppression tools. AU noted that where the ECDIS overlays the usage band 6 HD ENC over the existing coverage some features are obscured, AU highlighted light sector lines, to overcome this issue AU capture small areas around key features so they are included on the largescale coverage.

Planning phase – if business case accepted to proceed.

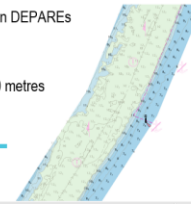
Consultation with stakeholders is to include information that AHO HDbENCs:

- will not include infrastructure – NP5 ENC should meet these requirements.
- will not include berthing pockets – these depths are normally advised by Harbourmasters by Notices to Mariners.
- may not be required if a larger scale M. CSGL area can be inserted into a NP5 to cover a particular area of concern.
- that polygons defining the HDbENC coverage be agreed upon including an additional 50metre overshoot containing bathymetric data to enable automated contouring.
- enforce that fact that bathymetric data will be clipped to this polygon for new and new edition ENC.
- will require a HDbENC survey meta data form to be submitted with each survey submitted for HDbENC production purposes. For example, surveys to agreed datums (no adjustment at AHO)



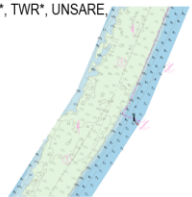
But better compilation tools available

- GIS systems - CARIS
- Automatic depth contour and depth area generation tools.
 - contour intervals of standard ranges: 0, 2, 5, 10
 - denser contour ranges at 1 metre intervals and
 - intermediate contours for example 10.4 metres to match associated berth pocket depths
- Ability to remove tiny deeps
- Automatic population of DRVAL1 and DRVAL2 in DEPARes
- Sounding suppression tool.
 - Sounding spacing normally between 25 and 100 metres



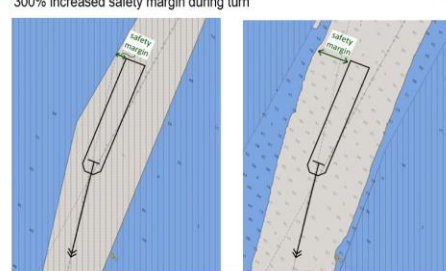
HDbENC Features

- DO NOT SHOW:** SEAAARE, ADMARE, DRGARE, HRBARE, M_NPUB, MAGVAR, MIPARE
- CONDITIONAL:** ACHARE, ACHBRT, CTNARE, RESARE, SANDWAV
- DO SHOW:** BRIDGE, CBLARE, CBL0HD, CBLSUB, HULKES, MORFAC, MARCUL, OBSTRN, PILBOP, PILPNT, PIPARE, PIP0HD, PIPSOL, PONTON, PYLONS, RDOCAL, TS_FEB, TS_PAD, TSS*, TWR*, UNSARE, UWTR0C, WATTUR



Cairns case study: Result - increased usable safety margin

- 300% increased safety margin during turn



Chair thanked AU for the insightful presentation which provided a good case study of HDbENCs and demonstrated the value to shipping.

DE questioned if the ENC are official given the ENC do not follow the S-57 guidance by omitting features, noting the change between DEPAR and DRGARE. AU responded that the ENC are official ENC and distributed through IC-ENC, the additional bathymetric information on the HDbENC negates the requirement to capture the DRGARE. AU continued to explain that SCAMIN is used on the DEPCNTs within the ENC, standard DEPCNT follow the S-57 recommendations whilst the supplementary DEPCNTs are assigned a value 1 greater than the compilation scale. AU states this is possible because the additional DEPARes are for the generation of the ECDIS safety contour.

DE questioned if the HDbENCs are created in dynamic seabed areas. AU states that the agreement on survey frequency is agreed with the harbour master, this would consider the frequency of change within the area, AU suggest they would be unable to produce HDbENCs quicker than the 2 weeks currently used. In some cases, the survey is conducted prior to a vessel arriving at the port to enable the ENC to be updated.

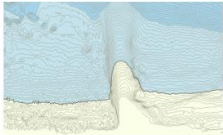
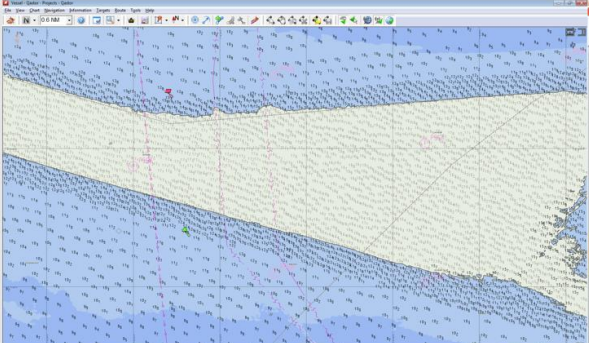
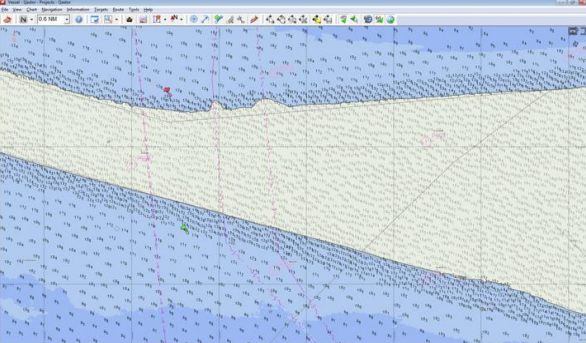
MT and NZ queried the use of automatically generated DEPCNTs and the creation of excess vertices within the ENC, AU responded that the use of automated DEPCNTS aids compilation and reduces the time to make the ENC, the automated software contain algorithms to ensure vertex density limits are not exceeded.

ES queried if the use of non-standard DEPCNT values could lead to confusion. AU states that the values are primarily for the use of the ECDIS to produce the safety contour, in addition, the primary users of the ENC will be the local port pilots who are familiar with the product and involved from the beginning of the process.

2.1.2.2 High Density Bathymetric Charts – BE

BE presented to members their experience producing High Density Bathymetric Charts on the North Sea and the River Westerscheldt to ensure safe shipping in the approaches to the ports of Zeebrugge and Antwerp – in cooperation with the Netherlands. The charts are only available to the pilots through an ECS on a Portable Pilot Unit as an additional product to the ENCs.

The charts are updated after every survey with new editions produces within 7 working days of the survey. The bathymetric information within each chart is dependent on the area and usage; the largest scale charts have greater depth information, with a contour interval up to 0.1m.

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| <p>➤ Purpose : Belgian and Dutch governments working together to guarantee a smooth and safe shipping on the river <u>Westerscheldt and its approach areas at sea</u>.</p> <p>Producing high density bathymetric charts "ECS" from 2007</p> <p>➤ Producers : On Dutch territory: Rijkswaterstaat On Belgian territory: Flemish Hydrography</p> | <p>ECS</p> <p>➤ Bathymetric data: depending of the area, usage, ...</p> <p>More soundings: 10m – 32.5m – 65m – 130m</p> <p>more depth contours:</p> <ul style="list-style-type: none"> ✓ Usage 4: 1.0m ✓ Usage 5: 0.5m ✓ Usage 6: 0.1m  |
| <p>ECS</p> <p>➤ QASTOR: software on the PPU (Portable Pilot Unit)</p>  | <p>ECS</p> <p>➤ QASTOR: software on the PPU (Portable Pilot Unit)</p>  |

Chair thanked BE for their presentation, stating this system appears to be very evolved. BE responded that the system has been in use since 2007 and now contains 650 charts. BE planning to use the experience with this product to integrate the 1m DEPCNTs into the official ENCs.

IT requested confirmation why BE decided to create these through the ECS instead of making official ENC's. BE stated that in the first instance these ENC's were not created to all the S-58 rules but for the ECS PPU system, they may therefore have some topological errors found during a full validation. In addition, using the ECS BE can include additional information that is only required by the pilots. With the quick production time of new editions, it may not be suitable for mariners to upload the regular new editions to their ECDIS systems. DE confirmed that where regular surveys take place it is not possible to distribute to the mariner before the data is superseded.

PCA queried what the maximum file size and geographic extent for each ENC is? BE was unsure of the sizes of each chart but will confirm to TC.

ACTION TC04/04: BE to confirm the geographic extent and file size of each ENC to be reported to TC delegates.

ACTION TC04/05: IC-ENC to explore the opportunities presented by high density bathymetry ENC's -

- Harmonisation/best practice production techniques
- Timeliness of distribution (some are made in areas of high frequency change, standard validation and weekly release may not be appropriate)
- Potential new licensing model requirements

Conclusions

4. N/A

Recommendations

5. N/A

Justification and Impacts

6. N/A

Action Required of the WENDWG

7. The WENDWG is invited to:
 - a. note this information paper as a contribution to the High Density Bathymetry ENC discussion.